1. VHF/UHF FREQUENCY ENGINEERING. Frequencies for VHF and UHF available to the FMO for engineering assignment are given in figures 1 and 2. VHF is used normally for communication with civil aircraft and a limited number of military aircraft. UHF is used only for communication with military aircraft.

a. In en route functions, a VHF and a UHF frequency are normally paired.

b. In terminal functions, a VHF and a UHF are paired for only some functions.

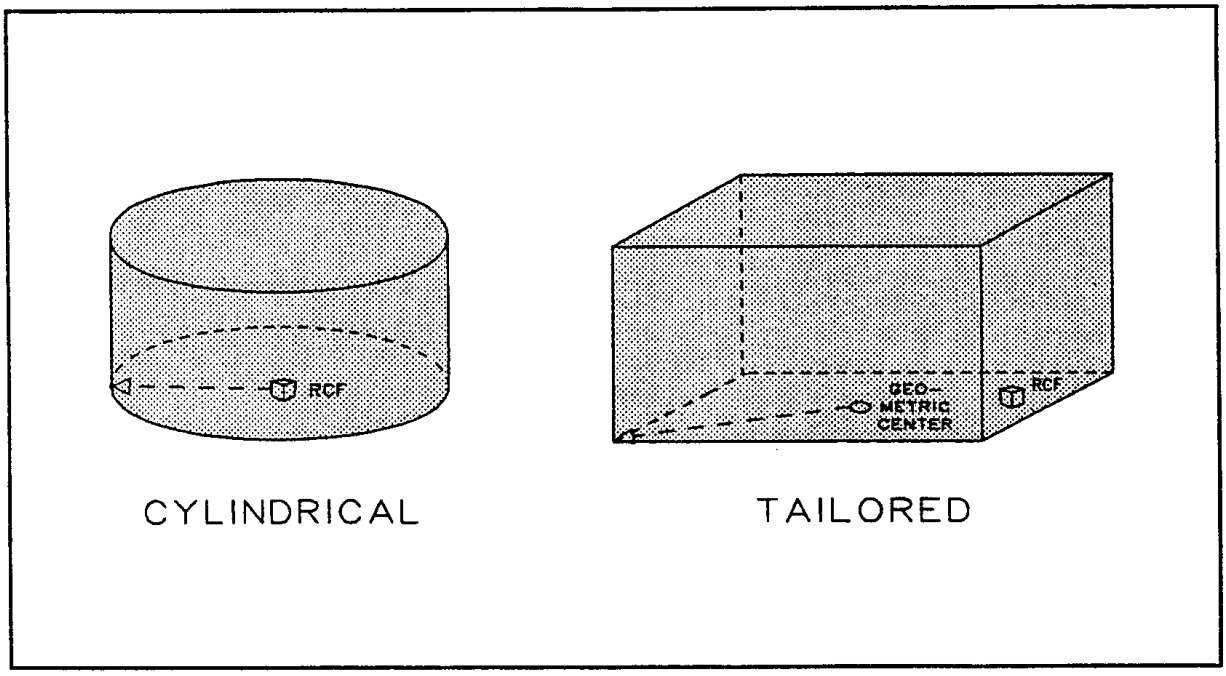
2. FPSV.

a. COMM frequencies are engineered for distinct volumes of airspace and are guaranteed to be free from a preset level of interference from an undesired source. Each specific function has its own FPSV. Some are cylinders, while others are odd geometric solids. These odd shapes are normally required for en route ATC functions. All FPSV's are valid only within Radio Line Of Sight (RLOS). Refer to paragraph 4 for details.

b. Cylindrical service volumes (CSV) are defined as radii in nmi usually centered on the facility, with the maximum altitude of the cylinder defined in feet. These parameters are defined for the various ATC functions in paragraph 2d, below. A sketch of a cylindrical service volume is shown in figure 3.

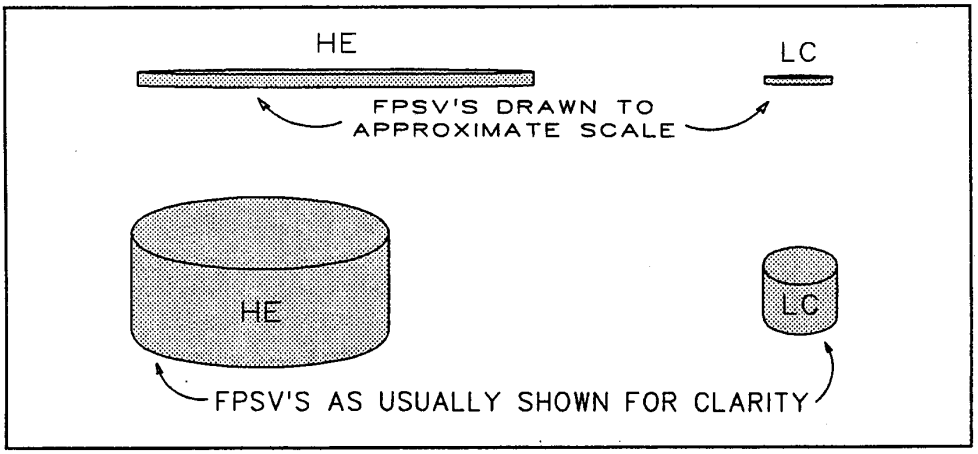
c. Tailored or "multipoint" service volumes (TSV) are unique shapes designed to afford necessary coverage within a designed interference-free protection level. The geometric center of the tailored service is the center point for the radius which is the distance to the farthest point of the TSV. A sketch of a typical TSV is also shown in figure 3. The geometric center and radius can be found by using the center point and radius of the smallest circle that will cover all of the TSV.

FIGURE 3. FPSV'S



d. FPSV graphic representations in this manual are drawn for illustrative purposes. They are not drawn to scale, but rather to a standard of clarity. An example of High Altitude En Route (HE) and Local Control (LC) to scale and as normally drawn is shown in figure 4. In addition, all FPSV's are drawn planar and do not include the curvature of the earth, as also shown in figure 4.

FIGURE 4. HE AND LC FPSV'S TO APPROXIMATE SCALE AND AS NORMALLY SHOWN PICTORIALLY



(1) ARTCC. Frequency assignments for ARTCC facilities are located at Remote Control Air/Ground (RCAG) sites. These RCAG's are connected to the ARTCC by telephone lines, microwave or other radio links. They are divided into categories of HE, Super High Altitude En Route (SE), Intermediate Altitude En Route (IE) and Low Altitude En Route (LE). They normally have tailored or multipoint service volumes, the maximum altitude and radius usually not exceeding the values shown in figure 5. Under no circumstances will an FPSV be approved with a radius greater than the RLOS distance.

FIGURE 5. EXAMPLE OF EN ROUTE DIMENSIONS

Service	Altitudes (feet)	Radius nmi
SE	>45,000¢ AMSL	150
HE	45,000¢ AMSL	150
IE	25,000¢ AMSL	60
LE	18,000¢ AMSL	60

(2) ATCT. These frequencies are usually found in the tower itself or at an RCF on or near the airport it serves. The service volumes normally have cylindrical

shapes and usually do not exceed values in figure 6. Under no circumstances will an FPSV be approved with a radius greater than the RLOS distance.

FIGURE 6. TYPICAL TERMINAL FPSV DIMENSIONS

Service	FPSV AGL	Radius nmi
Ground Control (GC)	100¢	2-5
Clearance Delivery (CD)	100¢	2-5
PAR (Military radar)	5,000¢	15
Helicopter (HC)	5,000¢	30
Local Control (LC)	25,000¢	30
Approach Control (AC)	25,000¢	60
Departure Control (DC)	25,000¢	60
Arrival Automated Terminal Information Service (ATIS)	25,000¢	60
Weather (AWOS/ASOS)	10,000¢	25
Departure ATIS	100¢	2-5

(3) Flight Service Station (FSS). FSS frequencies, including low altitude En Route Flight Advisory Service (EFAS), are located either at the FSS or at a nearby RCF. FSS frequencies are protected as much as is possible considering that many sites geographically within RLOS use the same frequency. This is normally accomplished by separating FSS cochannel assignments by at least 100 nmi, where possible.

e. Noncovered Services. The following VHF aeronautical frequency services are not covered by this appendix, since all are controlled and authorized by FCC. Refer to FCC Part 87 Rules and Regulations for details and frequencies.

(1) Aviation Support. Flying schools, soaring, ballooning, etc.

(2) Aeronautical Advisory (UNICOM). Fixed base operators.

(3) MULTICOM. A special use UNICOM.

(4) Flight Test. Manufacturer's use for flight tests of aircraft or equipment.

(5) Operational Control. Airlines' own use.

(6) Search And Rescue. As name implies.

(7) Airport Utility. Non-FAA vehicles on airports.